Table of Contents

National Policy on the Quality of Highways Indiana Policy on the Quality of Highways Certified Aggregate Producer Program Instructors Certified Aggregate Technician Training Course Agenda CAPP Procedures and Policies Manual

Chapter One – Introduction

	Rounding1-2The Mean1-3Standard Deviation1-3Five-Point Moving Average1-4
Chapter Two	– Aggregates in Indiana
	Origin of Aggregates
	Distribution of Aggregates
	Bedrock Deposits Aggregate Types
	Sand and Gravel Artificial Aggregates Classifications of Aggregate

Chapter Three – Aggregate Properties

	Physical Properties
	Absorption, Porosity, and Permeability
	Surface Texture
	Strength and Elasticity
	Density and Specific Gravity
	Aggregate Voids
	Hardness
	Particle Shape
	Coatings
	Undesirable Physical Components
	Chemical Properties
	Composition
	Reactions with Asphalt and Cement
	Surface Charge
	General Characteristics
	Compacted Aggregates
	Aggregate for Hot Mix Asphalt
	Aggregates for Portland Cement Concrete
	Other Aggregates
Chapter Four	- Aggregate Specifications and Requirements
	Physical Quality Requirements4-1
	Fine Aggregates
	Coarse Aggregates
	Physical Quality Tests
	Absorption
	Abrasion Resistance
	Soundness
	Deleterious Materials
	Clay Lumps and Friable Particles
	Structurally Weak Materials
	Coke and Iron
	Chert
	Special Requirements
	Fine Aggregates
	All Coarse Aggregates
	Dolomitic Aggregates
	Polish Resistant Aggregates
	Sandstone Aggregates
	Slag Aggregates
	7.
	Blended Aggregates
	Dolomitic Aggregates Polish Resistant Aggregates Sandstone Aggregates Slag Aggregates Type AS Aggregates Gravel Coarse Aggregates Type AP Aggregates

	General Usage Requirements
	Fine Aggregates
	Coarse Aggregates
	Gradation Requirements4-12
	Fine Aggregates
	Coarse Aggregates
	B Borrow and Structure Backfill
	Riprap
	Aggregate Base
	Subbase
	Aggregate Pavements or Shoulders
	Summary of Gradation Requirements
Chapter	Five – Aggregate Production
	Extraction
	Stripping
	Drilling and Blasting
	Shot Rock or Gravel Bank
	Crushing
	Scalping
	Primary Crushing
	Secondary and Tertiary Crushing
	Impact Crushing
	Other Benefaction
	Screening
	Production Quality
	Gradation Control
	Sand Production
	Natural Sand
	Manufactured Sand
	Processing
	Sographion 5 19
	Stockpiling and Handling
	Cone Stockpile
	Radial Stockpiles
	Truck Built Stockpiles
	Layered Stockpiles
	•
	Stockpiling – General
	Degradation
	Contamination
	Retrieval5-25

Chapter	Six -	Statistical	Ouality	Control for	Aggregate	Processing
CILAPICI	O 121	S tutio titul	~~~~		1100100	

	Process Characteristics6-1
	Continuous Processing
	Product Alternation
	Multiple Products
	Quality Control6-1
	Accuracy
	Precision
	Capability
	Understanding the Process6-4
	Current Process
	Process Stability
	Decision Making
	Process Capability
	Process Control
	Statistical Concepts6-7
	Data Sets
	The Mean
	Standard Deviation
	Normal Distribution
	Variability
	Capability and Compliance
	Control Charting
	When to Use Charts
	Control Chart Legend
	Beginning the Control Chart
	Plotting the Data
	Interpreting Control Charts
Chapter Seve	en – Quality Control Plan
	Quality Control Plan7-1
	Development 7-1
	Development Details
	Addenda
	Operational Type
	QCP Annex Overlity Control Plan Checklist
	Quality Control Plan Checklist

Chapter Eight – Testing Equipment

	Laboratory8-1
	General
	Sampling
	Sample Reduction
	Sieve Analysis
	Decantation
	Deleterious and Chert
	Test Equipment Verification
	Laboratory Set-Up 8-4
	Laboratory Set-Op
Chapter Nine	e – Sampling
	Safety
	Sample References 9-1
	1
	Sizes of Original Samples9-1
	Sample Types
	Methods of Sampling
	Production Sampling
	Bin Sample
	Discharge Sampling of Bins or Belts
	Belt Sampling
	Load-out Sampling
	Coarse Aggregate Stockpiles
	Fine Aggregate Stockpiles
	Sampling Direct from Trucks, Rail Cars, or Barges
	Reducing a Sample to Test Size
	Mechanical Splitter
	Sand Splitter
	Miniature Stockpile
	<u>.</u>
	Quartering
	Size of Test Sample (After Splitting)
Chapter Ten	– Testing
	Gradation
	Sieving
	Decantation
	Sieve Analysis Test
	Fineness Modulus
	Sieve Analysis for Dense Graded (Long Graded) Materials

	Delet	Materials
		erious Materials in Natural Sands
	Crushed Part	
		ngated Particles
		re Content
Chapter Ele	ven – Job Res	ponsibilities
•		
	Time	ement
		Sampling and Testing11-3
	Grada	
	Decar	ntation
		ned Particles
		erious Materials
		tional Tests
	Diary Requir	rements
Appendix A		
	Indiana Test	Methods
	202	Acid Insoluble Content of Fine Aggregates
	203	Control Procedures for Classification of Aggregates
	205	Acceptance Procedures for Dolomite Aggregates
	206	Scratch Hardness of Coarse Aggregate Particles
	207	Sampling Stockpiled Aggregates
	209	Soundness of Aggregates by Freezing and Thawing in a Brine
		Solution
	210	Class AP Coarse Aggregate for Concrete Pavement and Slab-on-
	211	Grade Concrete
	211	Certified Aggregate Producer Program
	212	Acceptance Procedures of Air Cooled Blast Furnace Slag for Leachate Determination
	214	
	214 902	Acceptance Procedures for Polish Resistant Aggregates Verifying Sieves
	902	Verifying Ovens
	903	Verifying Mechanical Shakers
	910	Verifying Balances

Appendix B

AASHTO Test Methods

- T 2 Sampling of Aggregates
- T 11 Materials Finer than 75 μm (No. 200) Sieve in Mineral Aggregates by Washing
- T 27 Sieve Analysis of Fine and Coarse Aggregates
- T 84 Specific Gravity and Absorption of Fine Aggregate
- T 85 Specific Gravity and Absorption of Coarse Aggregate
- T 112 Clay Lumps and Friable Particles in Aggregate
- T 248 Reducing Field Samples of Aggregate to Testing Size
- T 304 Uncompacted Void Content of Fine Aggregate

ASTM Test Methods

D 4791Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate

D 5821 Determining Percent of Fractured Particles in Coarse Aggregates

Appendix C

Quality Control Plans

Limerock Quarries, Inc. Indiana Quality Sand & Gravel, Inc.

Appendix D

Audits

Certified Aggregate Producer Program Audit Checklist Certified Aggregate Producer Program Partial Audit Checklist Sampling, Sample Reduction, and Testing Procedures